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Three new records of lichens from India

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भारतीय से शैवाक की तीन नई जातियों का प्रलेखन

योगेश जोशी, कपिल बिष्ट, शशि उपाध्याय, कृष्ण चंद्र

सारांश

तीन शैवाक की जातियां जैसे *क्लाउजाडिया इर्मसा, क्रोसाइनिया गोसिपिना* एवं *डेरमेटोकार्पन रेटीकुलेटम* को भारतीय शैवाक वनस्पतिजात में नई जाति के रूप में सूचित प्रलेखित किया गया है। इन सभी शैवाक जातियों की निदान संबंधी विशेषताओं और उनकी पारिस्थितिकी को भी शामिल किया गया है व प्रतिरूपों की जांच कर ली गई है।

ABSTRACT

Three lichen species *viz. Clauzadea immersa*, *Crocynia gossypina* and *Dermatocarpon reticulatum* are reported new to Indian lichen flora. All the species are appended here with diagnostic characteristics, ecology and the details of specimens examined.

Keywords: Lichenized Fungi, Taxonomy, Western Ghats, Western Himalaya

INTRODUCTION

In India, research on lichen taxonomy initiated during 1960's (Singh & Sinha, 2010) when Awasthi (1965) published the first checklist of lichens from India, Nepal, Pakistan and Ceylon (=Sri Lanka) which enumerated 1310 species belonging to 150 genera. Subsequent studies further strengthened the listing of lichens in India (Singh, 1980; Awasthi, 2000). Singh & Sinha (2010) provided an account of Indian lichens in their monumental work 'Indian Lichens: An Annotated Checklist' and reported 2305 species belonging to 305 genera and 74 families. Recently Sinha & al., (2018) compiled the literature published after 2010 and reported the occurrence of 2714 lichens in India. Though, the Indian lichen flora is believed to well explored and documented yet more and more species are being as added as explorations are extended to new areas. Since last eight years more than 400 species have been added to the list.

Recently, while going through the previous collections of lichens lodged at LWG and a field tour to Pithoragarh district, Uttarakhand the authors came across three interesting specimens. On critical examination, the identities of these species were confirmed as *Clauzadea immersa* from LWG, *Crocynia gossypina* from KFRI and *Dermatocarpon reticulatum* from Pithoragarh. All the three species are appended here with diagnostic characters based on the morphological and anatomical features, ecology, specimens examined and a critical note.

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MATERIALS AND METHODS

The specimens were examined under stereozoom dissecting microscope (SZM 2led OPTIKA) for morphological analysis. Anatomical features were examined under compound trinocular microscope (OLYMPUS BX53). The secondary chemistry of the lichen substances was detected by TLC as per Orange & al., (2001).

TAXONOMIC DESCRIPTION

Clauzadea immersa (Hoffm.) Hafellner & Bellem., Beihefte zur Nova Hedwigia 79: 322 (1984) **(Fig. 1A)**

Diagnostic characters: Thallus crustose, white to grey, immersed. Prothallus absent. Apothecia completely immersed in pits of substrate, (0.2–)0.3–0.5(–0.8) mm diam., ±level with the rock surface or slightly sunken, dark red brown to black, often white-grey pruinose. Thalline margin absent. Epithecium orange-brown to brown. Hymenium colourless to ±brown in upper part. Hypothecium ±hyaline. Paraphyses simple. Asci 8-spored, uniseriate, 55–60 × 12–20 µm, *Porpidia* type. Ascospores hyaline, simple, ellipsoid, 10–15(–19) × (6–)7–8(–9) µm, perispore distinct, up to 1 µm thick and ±granular ornamented in old spores. Pycnidia present. Conidia bacilliform, simple, 3–4 × 0.7–1 µm.

Spot tests: K-, C-, KC-, P-. TLC: No lichen compounds detected.

Ecology and *distribution*: The species was found colonizing on exposed calcareous rocks at an elevation of 1985 m. Previously, *Clauzadea immersa* was reported from Africa, Asia, Australia, British Islands, southern half of Greece (rarer in the north), Oceania, North America and Sweden (Arcadia, 2018; Gilbert & Hawksworth, 2009).

Specimen examined: India: Himachal Pradesh, Solan district, Pandav Cave, Karal Tibba, 30˚56.485' N, 77˚06.594' E, alt. 1985 m, 29 May 2013, *R. Bajpai* 13-014597 (LWG).

Notes: *C. immersa* resembles superficially to *C. metzleri* (Körb.) Clauzade & Cl. Roux ex D. Hawksw., in having ±immersed apothecia, but differs in having smaller dimensions of hymenium (45–60 vs 75–100 µm), ascospores [10–15(–19) × (6–)7–8(–9) vs (15–)16–20(–28) × (6–)8–10(–12) µm] and perispore (1 µm vs 2 µm), along with ±pruinose apothecial disc, deeply immersed and regularly distributed apothecia (Arcadia, 2018).

Crocynia gossypina (Sw.) A. Massal., Atti dell'Istituto Veneto Scienze 5: 252 (1860) **(Fig. 1B)**

Diagnostic characters: Thallus ecorticate, brittle, spongy, adnate, subcrenate-imbricate, subplacodioid-effigurate, composed by hyphal mass in which gonidia are imbedded, papillate heaps present; in above part yellowish-white and below whitish. Hyphae rugulose, loosely intertwined, simple or irregularly branched, septate. Algae occurring singly, or more often in aggregate granular groups, 17–20 µm diam. Apothecia brownish-black in colour, plane to convex, 0.3–0.7 mm diam., thalline margin paler. Epithecium pale brown. Hymenium hyaline. Hypothecium brown. Asci 6-8 spored, spores ellipsoid to oblong, simple, 4–6 × 2 µm.

Spot tests: Thallus K+ pale yellow, C-, P-. TLC: Atranorin.

Ecology and *distribution*: The species grows on the bark of large trees between elevations of 750 to 1000 m in Western Ghats of India. This species was previously reported from tropical regions of Australia, Asia, Central and South America, Oceania, Ecuador (Elix & McCarthy, 1998; Umaña-Tenorio & al., 2002; Harrie & al., 2013). In South America it has been reported from Brazil, Colombia, French Guiana, Guyana, Surinam and Venezuela (Hekking & Sipman, 1988; Sipman, 1992; Marcano & al., 1996; Cáceres, 2007; Sipman & al., 2008; Feuerer, 2013).

Specimens examined: India: Kerala, Palakkad district, Siruvani, Sinkampara, alt. 750 m, on *Cunnilia* bark, 11 Nov. 1998, *Stephen* 21131 (KFRI); Silent Valley National Park, Cheria Walakkad, alt. 1000 m, on bark, *s.d.*, *Stephen* 50h, 56w, 57i, 57v, 71f, 71n, 71x, 81a, 108o, 109q, 381, 611 (KFRI).

Notes: *C. pyxinoides* Nyl. resembles superficially to *C. gossypina* in having subplacodioid to effigurate thallus, but differs in being distinctly lobate, having very few apothecia, and presence of stictic acid along with atranorin (Nimis & al., 2017). The genus in India is so far represented by a single species – *C. indica* de Lesd., which is confined to the temperate region of Himalaya (Hue, 1924; Awasthi, 1965) and was collected from Pangi region of Chamba district, Himachal Pradesh in 1899 by Marten. No subsequent collection was reported since then (Singh & Sinha, 2010).

Dermatocarpon reticulatum H. Magnusson, *Annales de Cryptogamie Exotique* 5(1): 18 (1932) **(Fig. 1C)**

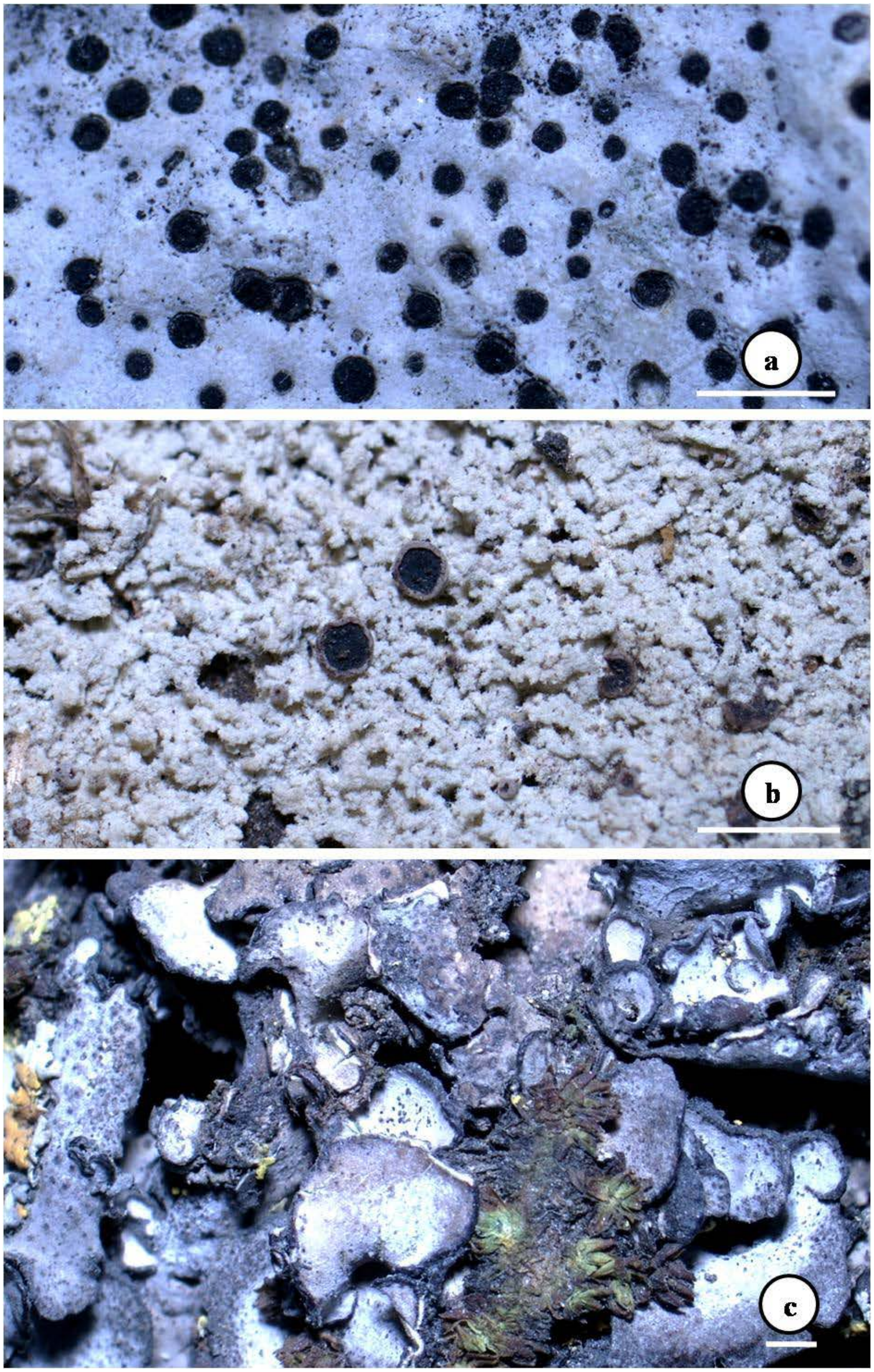

Fig. 1. **A.** *Clauzadea immersa* (13-014597), **B.** *Crocynia gossypina* (611), and **C.** *Dermatocarpon reticulatum* (2015-s.n.) (scale = 5 mm).

Diagnostic characters: Thallus foliose, single lobed attached by a single umbilicus, lobes 14–60 mm wide, upper surface grey with epinecral layer consisting of air filled hyphae. Upper cortex 130–240 µm thick. Medulla 180–350 µm thick. Lower cortex 90–110 µm thick. Lower surface brown, farinose and often reticulate, occasionally with rhizinomorphs. Perithecia obpyriform to globose, 200–530 × 170–440 µm with a hyaline exciple. Asci clavate or cylindrical, 8-spored. Ascospores simple, hyaline, 12–17 × 5–9 µm. Pycnidia immersed. Conidia bacilliform, 4–6 × 1 µm.

Spot tests: K-, C-, KC-, P-. TLC: No lichen compounds detected.

Ecology and *distribution*: The species was found colonizing on exposed rocks at an elevation 3999 m in alpine region of Uttarakhand. This species was previously reported from Western North America (Heiômarsson & Bruess, 2004).

Specimen examined: India: Uttarakhand, Pithoragarh district, Dharchula, Byans Valley, Kuti village, 30˚18.573' N, 80˚45.830' E, alt. 3999 m, 3 October 2015, *K. Bisht* s.n. (YJ).

Notes: Till date three species belonging to this genus are reported from India i.e. *D. meiophyllizum* Vain., *D. miniatum* (L.) W. Mann and *D. vellereum* Zschacke all of which differs from *D. reticulatum* due to the presence of farinose and reticulate lower surface.

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